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EXAMINER

TUCKER, WESLEY J

ART UNIT

PAPER NUMBER

2624

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |   |  |
|------------------------------|--------------------------------------|---|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>09/955,196 | <b>Applicant(s)</b><br>HIRAKOSO, HIROTO |  |
|                              | <b>Examiner</b><br>WESLEY TUCKER     | <b>Art Unit</b><br>2624                 |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 January 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3 and 5-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,5-9,13,17 and 21-26 is/are rejected.
- 7) ☒ Claim(s) 10-12,14-16 and 18-20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 23<sup>rd</sup> 2008 has been entered.

### ***Response to Amendment***

2. Applicant's response filed January 23<sup>rd</sup>, 2008 has been entered and made of record.

3. No claims have been amended. New claims 9-26 have been added. Claims 2 and 4 have been cancelled. Claims 1, 3 and 5-26 are now pending.

4. Applicant's remarks have been considered and are found unpersuasive for at least the following reasons:

Applicant has repeated remarks filed after the last final office action. So examiner will repeat the same response. Applicant argues primarily that Nakami does not disclose the interpolation function to be "asymmetric with respect to the right and left". Applicant argues on page 11 of the remarks that the Figure 19 of the function in Nakami reveals that the interpolation function is not asymmetric with respect to the right

and left of the axis of the abscissas. Applicant is advised that no such language appears in the claim. The claim language only recites that the function "is asymmetric with respect to the right and left." There is no indication in the claim of the right and left of what. There is no mention of an axis or abscissas. Indeed, what Applicant most probably intends to claim may be that the graph of the corresponding function is asymmetric with respect to a left and right of an axis of the graph coordinate system. Furthermore the function itself may be represented by an equation, algorithm, plot or graph. The function of Nakami is therefore reasonably broadly interpreted to be "asymmetric with respect to the right and left" as depicted in Figure 19, as Figure 19 itself is most certainly asymmetric with respect to the right and left. Further clarification of the claim language is required, if Applicant seeks to claim the right and left with respect to some point on a graph of the function. The rejection is accordingly maintained. New claims 10-12, 14-16 and 18-20 recite limitations that clarify what is asymmetric about the function and are accordingly indicated as allowable subject matter below.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 21-25 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,263,120 to Matsuoka.

With regard to claim 21, Matsuoka discloses an image processing method for a digital image, the method comprising:

Sampling discrete original pixels of an image (Figs. 2A, 2B and 3, Matsuoka discloses using discrete pixel values);

Calculating a value of an interpolation pixel in an area of said image between one of the discrete original pixels and another of the discrete original pixels (column 10, lines 9-40, Matsuoka discloses interpolating discrete pixels between neighboring sampled pixels),

Wherein the calculation step includes applying a processing method to said one of the discrete original pixels, and applying another method different than said processing method to said another of the discrete original pixels (column 10, lines 9-40, Matsuoka discloses using bilinear interpolation for areas with no edge content, while cubic convolution interpolation is used for areas that have edge content).

With regard to claims 22 and 23, Matsuoka discloses that bilinear interpolation to parts of the image and cubic convolution interpolation to other parts of the image according to edge content for the partial images (column 10, lines 9-40).

With regard to claim 24, Matsuoka discloses enlarging the digital image (column 1, lines 5-15). Images are most often interpolated to increase resolution which is effectively enlarging the image.

With regard to claim 25, Matsuoka further discloses reducing the digital image (column 1, lines 5-20). Matsuoka discloses zooming in on a partial image which is interpreted as reducing the image.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patent 6,510,254 to Nakami et al. and U.S. Patent 6,707,467 to Suga.

With regard to claim 1, Nakami discloses an image processing method for a digital image, characterized in that interpolation signals between discrete original pixels used for calculating an output pixel value are calculated using as an interpolation

function a function obtained by on composing a function based on a cubic convolution method and a function based on a bilinear method (Fig. 19). Nakami teaches that this hybrid (bilinear/cubic) bicubic function is useful in increasing the sharpness of the image (column 12, lines 25-30). Nakami also teaches that the amount of computation is becomes increasingly larger for the cubic method and that the trade off between image quality/sharpness and processing speed is optimal using the bicubic function (column 12, lines 30-39).

Nakami does not explicitly disclose an FIR digital filter using the interpolation function. FIR filters are exceedingly well known in the art to be used in interpolation. Suga teaches that FIR filters are known to be used for both linear and cubic interpolation methods (column 2, lines 23-40). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use an FIR filter to output the interpolated data from the linear and cubic interpolation method of Nakami as taught by Suga.

Nakami further discloses wherein said interpolation function is a function that is obtained by composing a part of the function based on the cubic convolution method and a part of the function based on the bilinear method. Nakami further discloses where the interpolation is asymmetric with respect to the right and left (Fig. 19). The discussion of the use of an FIR filter as taught by Suga with regard to claim 1 also applies.

The function taught by Nakami is clearly composed of both cubic and bilinear functions and is furthermore asymmetric with respect to right and left. This is clear in

fig. 19. Nakami does not discuss implementing the function using a FIR. However it is well known in the art that filters are used to perform and implement interpolation functions such as cubic and bilinear methods. Suga teaches that FIRs are used to implement any number of interpolation functions and explicitly mentions both cubic and linear methods. It only follows that a FIR would be used to implement the interpolation function disclosed by Nakami. Indeed Nakami's function will have to be applied to the image data in operation in some manner. The most common and exceedingly well-known method in image processing for implementing an interpolation function is through the use of a filter. Suga clearly teaches that an FIR may be used in implementing both cubic and linear methods. One of reasonable skill in the art would obviously conclude that the combination function determined by Nakami would be applied using a filter and Suga teaches explicitly that a FIR filter is used.

With regard to claim 3, the discussion of claim 1 applies. Nakami discloses an apparatus to be used with his method (Fig. 2).

With regard to claim 5, Nakami and Suga disclose the method as claimed in claim 1, and they are both considered to disclose that the method is for use in enlarging or reducing the digital image because that is what interpolation is inherently used for. When interpolation is performed pixels are created or reversely they are deleted inherently expanding or decreasing the image.



With regard to claim 6, the discussion of claim 5 applies.

With regard to claim 7, the discussion of claim 3 and claim 1 apply. Both the references to Nakami and Suga are interpreted to operate as electronic devices (Suga Fig. 1B and Nakami Fig. 2).

With regard to claim 8, the discussion of claim 5 applies.

7. Claims 9, 13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patent 6,510,254 to Nakami et al., U.S. Patent 6,707,467 to Suga, and U.S. Patent 5,517,584 to Jennings.

With regard to claims 9, 13 and 17, Nakami disclose the method, device and apparatus of claims 1, 3 and 7 respectively, but do they not disclose that the FIR used by Suga is a second order FIR digital filter. Jennings teaches the use of a second order FIR filter for image scaling (column 2, lines 35-47 and column 3, lines 4-16). The second order FIR filter is used to change the resolution of the display in the environment of interpolation. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use the second order FIR filter of Jennings in combination with the interpolation techniques taught by Nakami and the FIR filter taught by Suga in order to interpolate and change the resolution of the image.

8. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patents 6,263,120 to Matsuoka and 5,517,584 to Jennings.

With regard to claim 26, Matsuoka discloses the steps of claim 21 as discussed above, but does not disclose that they be performed with a second order FIR digital filter. Jennings teaches the use of a second order FIR filter for image scaling (column 2, lines 35-47 and column 3, lines 4-16). The second order FIR filter is used to change the resolution of the display in the environment of interpolation. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use the second order FIR filter of Jennings in combination with the interpolation techniques taught by Matsuoka in order to interpolate and change the resolution of the image.

#### ***Allowable Subject Matter***

9. Claims 10-12, 14-16 and 18-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Claims 10-12, 14-16 and 18-20 define the function that is a combination of both cubic convolution and bilinear interpolation. Neither Nakami nor Suga nor any other found prior art of record teaches or fairly suggests a function defined by the limitations of claims 10-12, 14-16 and 18-20.

***Contact Information***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to WESLEY TUCKER whose telephone number is (571)272-7427. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Bella can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wes Tucker/  
Examiner, Art Unit 2624